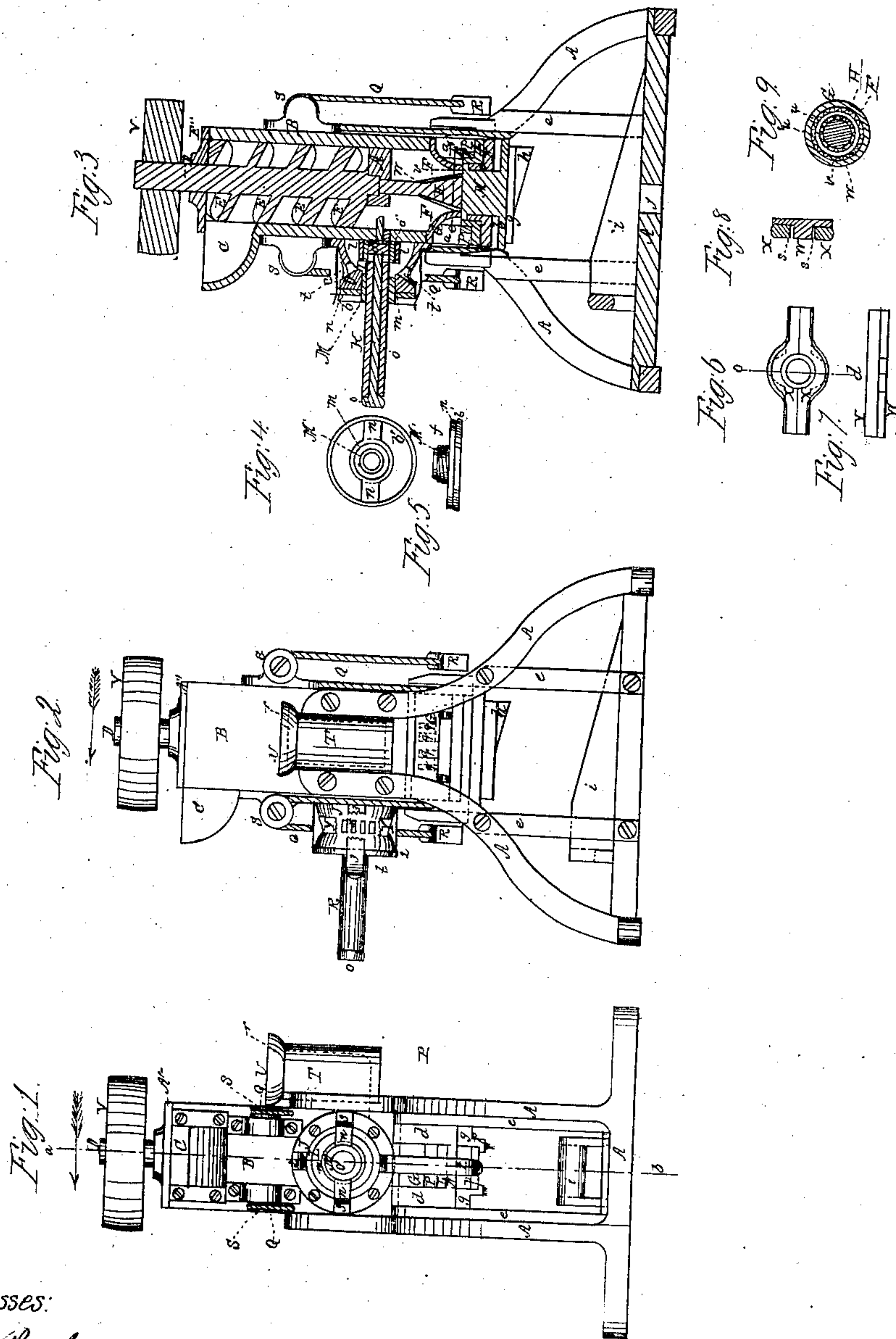


S. Ustick, Tile Machine.

N^o 27602.

Patented Mar. 20, 1860.



Witnesses:

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CLAY-PIPE MACHINE.

Specification of Letters Patent No. 27,602, dated March 20, 1860.

To all whom it may concern:

Be it known that I, STEPHEN USTICK, of the city of Philadelphia and State of Pennsylvania, have invented a new and useful
5 Improvement in Machines for Making Clay Pipes, and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, which make a part of this specification, in
10 which—

Figure 1, is an end view of the machine. Fig. 2, is a side elevation of the same. Fig. 3, is a cross perpendicular section through the red line *a, b*, of Fig. 1. Fig. 4, is a
15 face view of the flanged core *M'*, and ring *m*. Fig. 5, is a view of the same pieces at right angle with Fig. 4. Fig. 6, is a face view of the plug *W* and clamps *X, X*. Fig. 7, is an edge view of the same. Fig. 8, is a
20 cross section of do. through the red line *c, d*, of Fig. 6. Fig. 9, is a cross section of the die pieces *G, H*, through the red line *e, f*, of Fig. 3.

Like characters in all the figures represent
25 the same parts of the machine.

The nature of my invention and improvement consists in constructing the die pieces of clay pipe machines with a series of perforations or openings which are filled with
30 cotton or other suitable material, to draw off the excess of water from the prepared clay before the latter passes through the dies; and also forming grooves or channels in the said pieces, that are filled in like manner, for the purpose of drawing a portion
35 of the water contained in the clay to the lips of the dies, to lubricate them; and other novel arrangements—the machine being constructed and operating in the manner I will
40 hereafter fully describe.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

A, is the standing frame of the machine.
45 *B*, is a cylindrical chamber which receives the prepared clay from the hopper *C*.

D, is the driving shaft. *E*, is a screw flanch of said shaft for forcing the clay through the dies *F*, and *I*, the former of
50 which is formed by the combination and arrangement of the pieces *G*, and *H*, and the latter by the plate *J*, and mandrel *K*, as represented in Fig. 3. The mandrel *K*, also

serves for conducting the pipe from the die *I*, as it is formed. It is reduced on its lower
55 side to free the pipe from the same.

L, is the mold for forming the bell end of the pipe, as the clay passes through the die *F*. It is bolted fast to the corner pieces *a*, which are on the lower side of the die
60 plate *G*.

M, is a core for forming the inside of the bell end of the pipe. It has perpendicular ribs *q*, which form grooves to hold the packing. It is held in its place by the springs *1, 1*,
65 which bear against the flanch *b*, it being brought previously to its position by the action of the rabbet pieces *g, g*, on the lower side of the plate *N*, in the upward motion of the same. The plate *N* has a ring *e*,
70 which fits in the mold *L*. Said ring is elevated into the mold and kept against the lower part of the bell end of the pipe during the formation of the pipe to sustain the same by the combination and arrange-
75 ment of the cords *Q*, weights *R*, and pulleys *S*, with the flanch or plate *N*, of said ring. The primary object of the ring, however, is to prevent the mold being filled with air previous to its reception of the clay, and to
80 allow any that may enter the mold with the clay to pass out of the former through the joint around the ring and thus to insure compactness to the bell end of the pipe. Another object is to effect an automatic
85 opening of the mold when the bell end of the pipe is formed. The plate *N*, has corner pieces *d*, with rabbets which fit against the guide strips *e*. There are bevel pieces *h*, on the rabbet pieces *g*, which are brought
90 to rest on the corresponding bevel edges of the adjustable sliding frame *i*. The quadrilateral frame *P*, which is guided by the corner pieces *a*, which are on the lower side of the plate *G*, has a wire *p*, stretched across
95 its upper side for the purpose of cutting off the pipe.

The mandrel *K*, is screwed into the side of the cylinder *B*. There are openings around the mandrel for the passage of the
100 clay from the cylinder *B*, to the die *I*.

l, is a circular chamber which is screwed on the mandrel *K*, for the purpose which will be hereafter described.

M' is a core which is placed on the man-
105 drel *K*, for forming the inside of the bell

end of the pipe. It has a helical bead *f*, on its periphery for forming a packing groove in the bell end of the pipe; and a flanch *b'*, which rests against the front of the die piece J, during the formation of the bell end of the pipe, it being held by the springs 2, 2.

m, is a ring which fits in the mold L', whose use is similar to that of the ring *c*, above described. It has arms *n*, against which the springs 3, 3, bear to hold it in its place, which springs yield as it slides on the mandrel K, while the bell end of the pipe is being formed.

O, is a rod, in a central opening of the mandrel K, which has a knob O', on its outer end, which serves as a handle to shift it by. It has on its rear end a ring O'', which is connected with it by a flat bar O''', that slides in a perpendicular slot in the mandrel K. Said ring is for the purpose of cutting off the communication of the die I, from the clay when the pipe has attained its proper length. The chamber or ring *l*, is for the purpose of incasing the ring O'', to prevent the clay getting into the slot in the mandrel K.

T, is a safety chamber which communicates with the clay cylinder B, and U, is a valve which is situated in the same, said valve having a chamber, or sink, *r*, for the purpose of holding weights which may be added to or diminished, in accommodation to the pressure of the clay in the cylinder B. The object of the chamber T, will be clearly understood when we explain the operation of the machine.

V, is a band wheel on the driving shaft D, which communicates by means of a belt with steam or other power.

The operation of the machine is as follows: Power being communicated to the driving shaft B, by means of the pulley V, which turns in the direction of the arrow, the screw blade E, forces the clay down the cylinder B, as it is thrown into the hopper C, and by the time it has reached the dies F, and I, it is somewhat condensed, in consequence of the area between the turns of the blade being decreased in size either by the thickening of the blade as it descends, as represented in the drawings, or by enlarging the shaft D, in a similar manner. As it is desirable to have as little water in the clay as possible as it passes through the dies, I discharge it in a considerable degree by means of openings in the die plates G, and J, as represented by the openings *t*, in the die piece J, in Fig. 2. The clay is prevented passing through the openings by their being filled with cotton, wool, or other suitable material which is held in place by the band or wrapper Y, through which the water oozes. The water may fall into and be carried away from the machine by a

spout or trough. I lubricate the lips of the dies with water from the clay as represented in Fig. 9, which is a cross section of the die pieces G and H, through the red line *e*, *f*, by means of the grooves *u*, in the surfaces of the dies being filled with cotton, wool or other porous substance, which take up a certain amount of water from the clay and convey it to the lips of the dies for the purpose of keeping them smooth, to insure smoothness to the inner and outer surfaces of the pipes. The grooves *u*, are covered by the sheaths *v*, and *w*, which I usually make of brass to prevent their oxidation. When the clay has passed through the die F, and has reached the ring *c*, the latter which is held up by means of the cords Q, weights R and pulley S, descends by the force of the clay against it. By the time the said ring has got out of the mold the bell end of the pipe is formed, and the plate N, to which the ring is attached is brought to bear against the flanch *b*, of the core M, and forces the latter from between the springs 1, 1, thus effecting a free passage of the clay through the die F, to form the straight part of the pipe, the bell end still resting on the ring *c*; and when the pipe has attained its proper length the bevel pieces *h*, rest on the adjustable sliding frame *i*. The driving shaft D, is then stopped by means of a shifter or otherwise and the sliding frame P, is moved until the wire *p* has cut off the pipe. The sliding frame *i* is then drawn forward sufficiently far to bring the upper end of the pipe below the mold L. The plug W, is then placed in the upper end of the pipe and the clamps X, X, drawn against the latter—the beads *s*, *s*, forming annular grooves to hold the packing. The pipe is then carried away and set for drying. If the shifter is not moved instantly when the pipe is formed the clay is liable to become packed in the cylinder B, and strain the machine. To avoid this I have provided the safety chamber T, into which the clay rushes, and the weighted valve U, yields to it until the power is checked.

The pipe is made through the die I, in a similar manner to the operation just described. The springs 2, 2, bear against the flanch *b'*, of the core M', and the springs 3, 3, bear against the arms *n*, *n*, of the ring *m*, until the bell end of the pipe is formed. The said core and ring by the pressure of the clay against them are then forced from between the springs 2, 2, and 3, 3, and pass over the mandrel K, to its front end during the formation of the straight part of the pipe. The rod O, is then drawn forward until the ring O'' has entered the die I, and cut off the pipe. The core M' is then unscrewed and the pipe is removed from the mandrel K, and carried away and set for drying, with the bell end down; the an-

nular grooves are then formed on the small end as described above.

I make the die pieces as flaring as practicable as represented in the drawings in order to give but little resistance to the clay in entering the dies, instead of having them flat, the usual form which gives great resistance to the clay. Instead of guiding the plate N, to which the ring *c*, is attached by means of the strips *e*, the object may be accomplished by having a rod connected at one end with the rabbet pieces *g*, *g*, on the lower side of said plate and guiding said rod by means of the eye *j*, in the bottom of the standing frame A, for the purpose of giving more room to take the pipe away.

It is my intention to make the larger sized pipes through the lower end of the cylinder B, and the smaller ones at the sides, when both kinds are made at the same time, as large pipes are liable to swag in a horizontal position. I also intend to make draining, and other, tile at the sides of the machine. When pipes, or other things, which are made through the sides of the cylinder, are to have their ends of other form than flat I give counter form to the face of the ring *m*, and the cut off ring O''.

Instead of putting the clay in a hopper at the upper end of the cylinder B, when it is inconvenient to elevate it, the machine may be so constructed as to have the pipe formed at the upper end of the cylinder, in which case the hopper C, and pulley V must be at the lower end of the same. This arrangement is made practicable by the novel arrangement of the hopper C, on the side of the cylinder B, besides making the driving shaft D, much shorter thereby.

Having thus fully described the construction and operation of the clay pipe machine as invented or improved by me, what I claim

therein as new and desire to secure by Letters Patent is,

1. Constructing the die piece J, with perforations, or openings *t*, to be filled with cotton, wool or other equivalent substance, in combination with the band or wrapper Y, substantially as and for the purpose above described.

2. The grooves, or channels *u*, in the die pieces G and H, to be filled with cotton or other suitable fibrous substance, or an equivalent, in combination with the sheaths *v*, and *w*, for the purpose of lubricating the lips of the dies as described and shown.

3. The combination of the springs 1, 1, with the core M, for the purpose of holding the latter in its place during the formation of the bell end of the pipe, substantially as described.

4. Combining and arranging the ring *c*, with the mold L, and core M, substantially as and for the purposes above set forth.

5. The combination and arrangement of the bevel pieces *h*, with the adjustable sliding frame *i*, as and for the purposes above described.

6. The cut off ring O'', in combination with the shifting rod O, or its equivalent when arranged and operating in relation to the die I, substantially in the manner and for the purposes set forth.

7. The safety chamber T, provided with the valve U, arranged and operating in relation to the clay cylinder B, substantially as, and for, the purpose above set forth.

In testimony that the above is my invention I have hereunto set my hand and seal this 21st day of December 1859.

STEPHEN USTICK. [L. s.]

Witnesses:

THOMAS J. BEWLEY,
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